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A new term, "helicomorphy," is suggested to comprehend GOEBEL's two terms for the two leaf forms in heteroblastic species, the juvenile forms and successive forms. In the course of a short chapter on the phylogenetic significance of helicomorphy, the author pays his respects to the famous "biogenetic law," that ontogeny recapitulates phylogeny, in these terms: "In the botanical field it has absolutely no (nicht einmal immer) heuristic value, and whoever allows himself to be led by it will at most succeed in satisfying the needs of his imagination."

The book is one to be commended to all sorts of botanists; morphologists, physiologists, ecologists, and taxonomists will alike profit by its perusal.—C. R. B.

NOTES FOR STUDENTS

Soil chemics and plant distribution.—Of late the physical character of the soil, and especially the relation of the soil to water, has been more and more regarded as the greatest single factor that determines plant distribution. For this reason the contribution of FERNALD³ will come to most with something of a shock. FERNALD feels that the dissimilarity of the floras of the alpine districts of New England and adjoining regions cannot be explained by differences in precipitation, exposure, fineness or coarseness of the soil, or water content of the soil. On the other hand, it is possible to divide the alpine regions into three groups on the basis of similar floras. The striking thing that then appears is that the three groups can also be split in the same way on the basis of the chemical nature of the subjacent rocks. One group, including the Adirondacks, Green Mountains, White Mountains, and Mt. Katahdin, is characterized by granites, gneisses, or mica schists, all rich in potassium. The second group, including Smuggler's Notch, Mt. Willoughby, and the Gaspé coast, is characterized by calcareous rocks. The third group includes only the one remarkable area of Mt. Albert, where many plants are found that are known from nowhere else in that part of the continent; this area is one of serpentine. It will thus be seen that FERNALD's groups correspond to those made long ago in Europe by partisans of the chemical theory, except that the European silicicole group is replaced by FERNALD's potassium group. It is likely that in a complex world not everything is to be referred to one cause, and perhaps we have been too ready to see in soil water the answer to all distribution problems. If so, FERNALD's paper will serve an excellent purpose in giving better balance to our views. Yet it must be remembered that this paper is wholly observational, and it is very doubtful if physical and chemical factors can be adequately analyzed in the field. The trend of recent experimental work is mostly toward physical theories or toxic phases of chemical theories, and until FERNALD's theories are substantiated by rigid experimental tests, it is doubtful if they can find acceptance. It is well also to call attention to the idea expressed so long ago by DECANDOLLE in this connection, that what holds

³ FERNALD, M. L., The soil preferences of certain alpine and subalpine plants. *Rhodora* 9:149-193. 1907.

true for one region may be far from true in another. For example, *Shepherdia canadensis*, *Artémisia canadensis*, and *Pellaea atropurpurea* are cited as calcicoles. In the Chicago region, only the latter is commonly a calcicole, and it is also a silicicole. It is doubtful too if the chemical theory can account for the prevalence of alpine plants in bogs, a phenomenon readily explained by the current theories.—HENRY C. COWLES.

Ecological notes from New Zealand.—Some of COCKAYNE'S⁴ brief papers should be noticed here. *Coprosma Baueri* is found to show a striking case of leaf variation. In the usual natural habitat the leaves are fleshy and have margins so recurved as to be called "rolled;" in shade the leaves are much larger and quite flat. An accompanying photograph shows how striking is the variation. The second paper discusses the supposed finding of a seashore *Celmisia* in the mountains; the two forms are very similar, but COCKAYNE believes, as everyone must in these days, that the court of last resort in the determination of the validity of species is no longer the herbarium but the experimental garden. The Poor Knights Islands are small precipitous islands exposed to the open sea and never before visited by a naturalist. The scrub formation, in which *Suttonia divaricata* dominates, differs from any allied New Zealand formation; the luxuriance of the arborescent plants is very remarkable in view of the great exposure of the islands. A *Carmichaelia*, known previously from but one place and that far away, probably attests that the species was once widespread. In another paper, COCKAYNE⁵ has added another to the long list of probable mutants observed in nature. This case is of special interest because the mutation is in a plant well known in the region, and is too conspicuous to be overlooked. *Leptospermum scoparium* is one of the commonest weeds of New Zealand, and possesses white or sometimes pink flowers. The "mutant" consists of a crimson-flowered form, and it is noteworthy that the foliage is so much darker that it is easy to pick out the mutant in the seedling condition. In connection with COCKAYNE'S studies it should be noted that he has published a large amount of ecological literature in popular form in the *Lyttelton Times*, a Christchurch paper. These essays have been well written and must have done much to interest New Zealanders in the remarkable vegetation of their country, and to induce them to take steps to preserve this vegetation in large part through the medium of government reservations.—HENRY C. COWLES.

Plant-breeding in the tropics.—LOCK⁶ has published a third report on hybridization experiments carried on at Peradeniya, Ceylon, giving in detail the results

⁴ COCKAYNE, L., On a specific case of leaf variation in *Coprosma Baueri* Endl.; on the supposed Mount Bonpland habitat of *Celmisia Lindsayi* Hook. f.; Notes on a brief botanical visit to the Poor Knights Islands. Trans. N. Z. Inst. 38:341-360. 1906.

⁵ COCKAYNE, L., On the sudden appearance of a new character in an individual of *Leptospermum scoparium*. New Phytologist 6:43-46. 1907.

⁶ LOCK, R. H., Studies in plant breeding in the tropics. III. Experiments with maize. Ann. Roy. Bot. Gard. Peradeniya 3: 95-184. 1906.